VG Semicon MBE from Lab to Fab

David Williams

VG Semicon introduced functional multi-wafer MBE to the world in 1989 with the V100, and has just announced the tenth V100 system order.

World Leaders

Molecular Beam Epitaxy (MBE) is rapidly becoming established as the technique of choice for the production of modern high-performance digital and optoelectronic devices.

VG Semicon is setting the standards for MBE in laboratory and production applications. This has been achieved by adopting three key strategies:

- Continuous incremental improvement
- Simple designs are the most efficient, reliable and elegant
- Providing comprehensive service and process technology support.

Track record

The company has an impressive pedigree in MBE equipment manufacture:

- VG Semicon has been a commercial MBE systems supplier since the 1970s

Systems are offered for all MBE processes, including:

- Solid source MBE
- Gas source MBE
- Chemical beam epitaxy

Equipment is supplied for applications such as

- III-V: GaAs, AlGaAs, InGaAs, AlGaInP, GaN, etc.
- II-VI: ZnSe, ZnSSe, CdTe, CdHgTe, etc.
- Metals, superconductors, fluorides, Si, Si-Ge, etc.

What our ctomers say:

"Device characteristics are excellent. I am delighted".

Robert Bryan, V.P. Vixel Corp. February 1994

"With the V100, VG Semicon has developed the right product at the right time, not only for its own benefit, but also for the whole GaAs industry".

Linh T. Nuyen, President, Picogiga, 21 March 1995

"Material of exceptional quality and uniformity has been produced" with the V100. "The rests simply speak for themselves".

Tom Hierl, President, QED (in III-Vs Review), October 1994

"The IRC has made a major investment in MBE. The two V80H's for III-Vs and the GSMBE systems for SiGe are producing first rate material and first rate science!"

Bruce Joyce, Director Semiconductor IRC, Imperial College, March 1995

VG Semicon systems are in use at many well-known labs and fabs, e.g.

- Picogiga
- QED
- Motorola
- Sumitomo
- Sharp
- Bell Labs
- Thomson CSF
- NTT
- Mitsubishi
- Tokyo Univ.
- Imperial College
- Hughes
- Texas Instruments

Indeed, the fact that so many VG Semicon customers come back to buy second or third machines speaks volumes.

Production MBE

VG Semicon has created the market for production MBE equipment and completely dominates this market. Discrete devices for digital applications like HEMTs, HBTs and FETs, for optoelectronics, such as red lasers, as well as integrated circuits for microwave applications have all been grown on the V100. This transition from lab to fab has been achieved by an increase in the capacity of the equipment, and also the attainment of the necessary levels of performance, throughput and reliability. All of these features are the hallmark of the V100:

- Throughput: 1000 x 4" or 1800 x 3" wafers per month

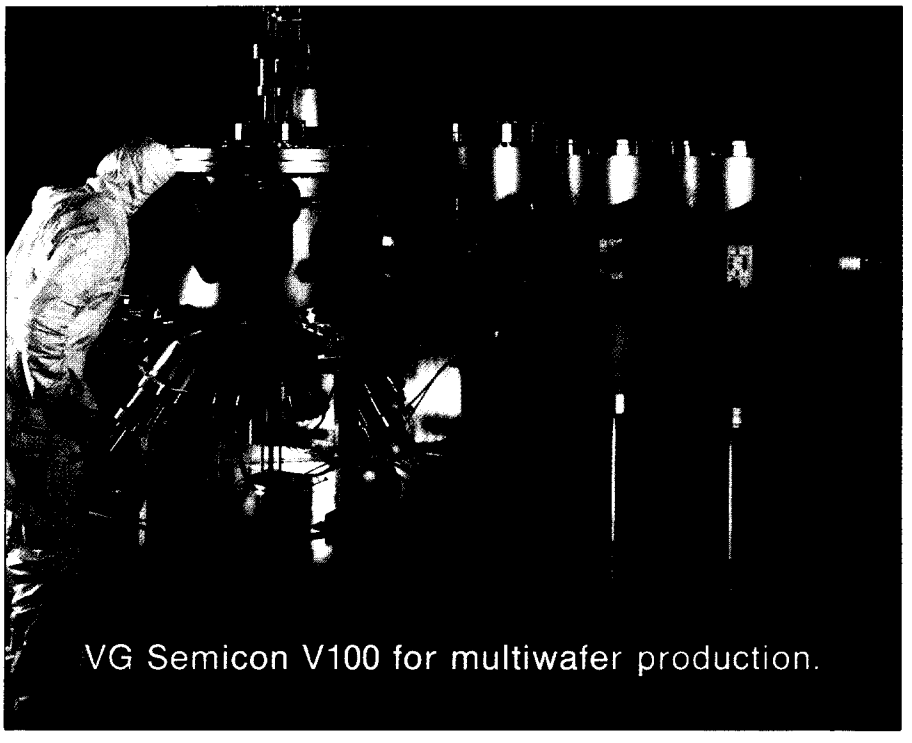
- Reliability: consistent with the stringent demands of the industry in terms of mean time between failure and speed of response
- Yield: uniformities of around 1% in terms of thickness, composition and doping help to maximise the usable device area per wafer
- Return on investment: the above factors combine to maximise the ROI for the customer

Your mobile phone probably contains devices that were grown on a V100.

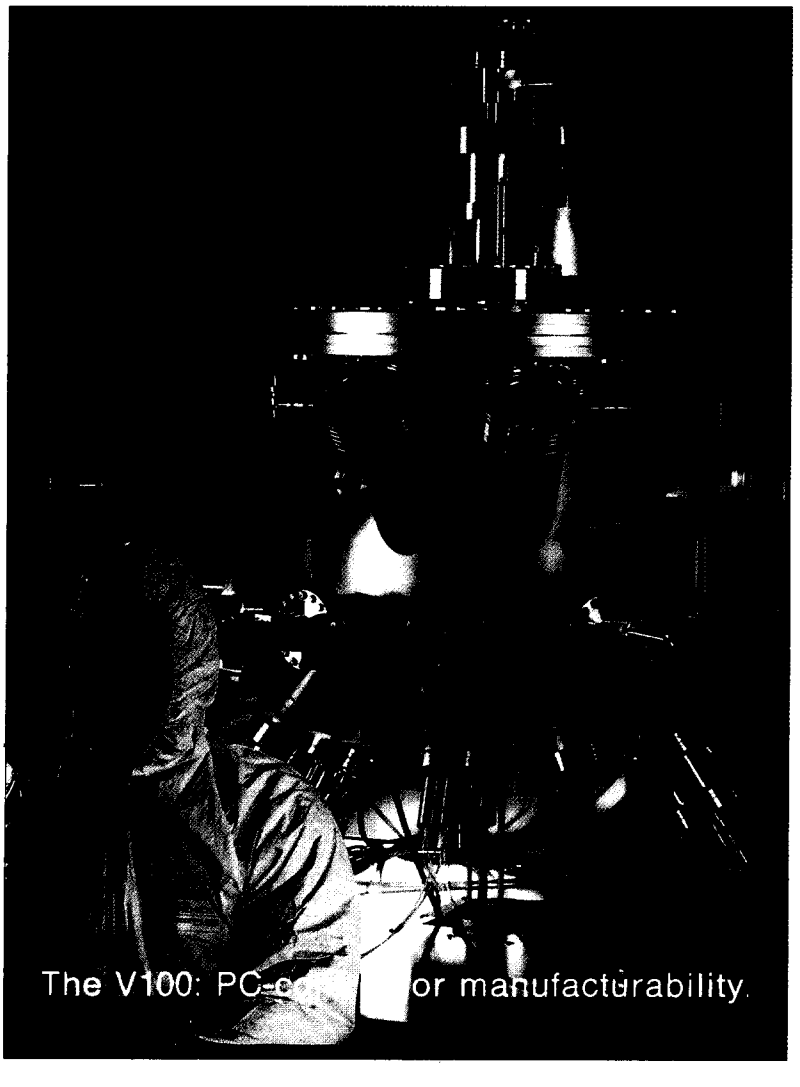
VG Semicon innovations

Simplicity, reliability and performance are key to successful designs:

- Soft action shutters (patented)
- Bellows-free wafer rotation (patented)
- Water-cooled cells for thermal stability and reduced liquid nitrogen consumption



VG Semicon V100 for multiwafer production.



The V100: PC-c or manufacturability.

- Compact, reliable wafer transfer
- Optimised deposition geometry
- Large-area, high-uniformity wafer heating
- Dual valve pressure control for GSMBE and CBE, giving faster, more reliable and more efficient performance.

Worldwide coverage

VG Semicon covers the globe in terms of Sales Offices, Agencies and Representatives:

- It is part of one of the world's largest, strongest and established Scientific Instruments groups
- Specialist after-sales customer care service, spares and support organisation
- VG Semicon's worldwide leadership in production MBE is confirmed by systems in Japan, the USA and Europe, all backed by the necessary support infrastructure.

The Future

For current applications, continuous product improvements and refined process technology will result in increased ROI for our customers. In parallel, the company is continually monitoring opportunities to bring more materials into full-scale production.

Why take risks when the chips are down? Talk to VG Semicon.